Non-lethal beaver management for restoration: Big Spring Creek case study

Benjamin Dittbrenner

University of Washington

& Beavers Northwest

Josh Latterell

King County

Overview

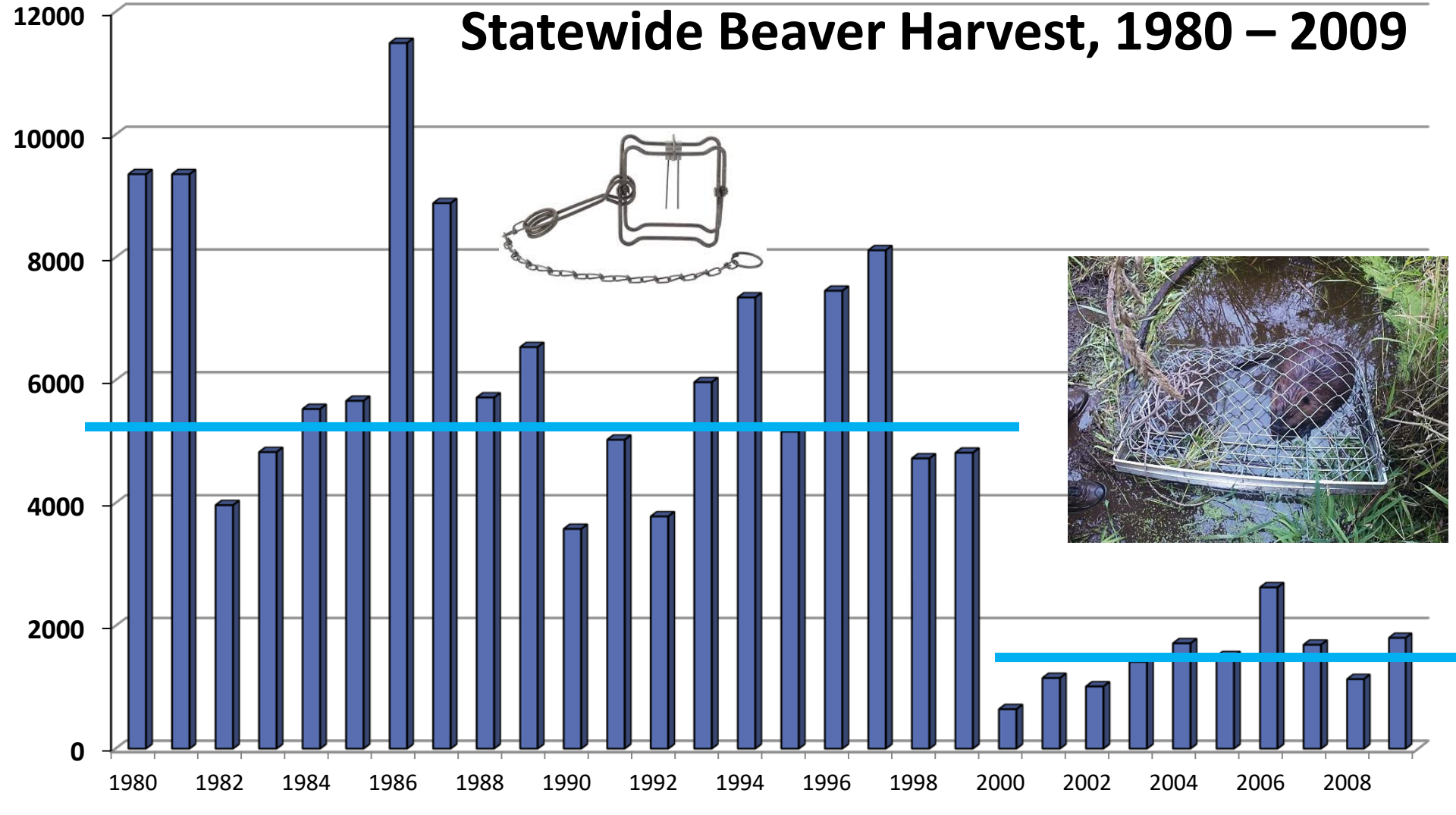
- Beaver population expansion
- Process-based restoration
- How beavers fit into paradigm
- Big Spring Creek restoration project case study

Return of Beavers

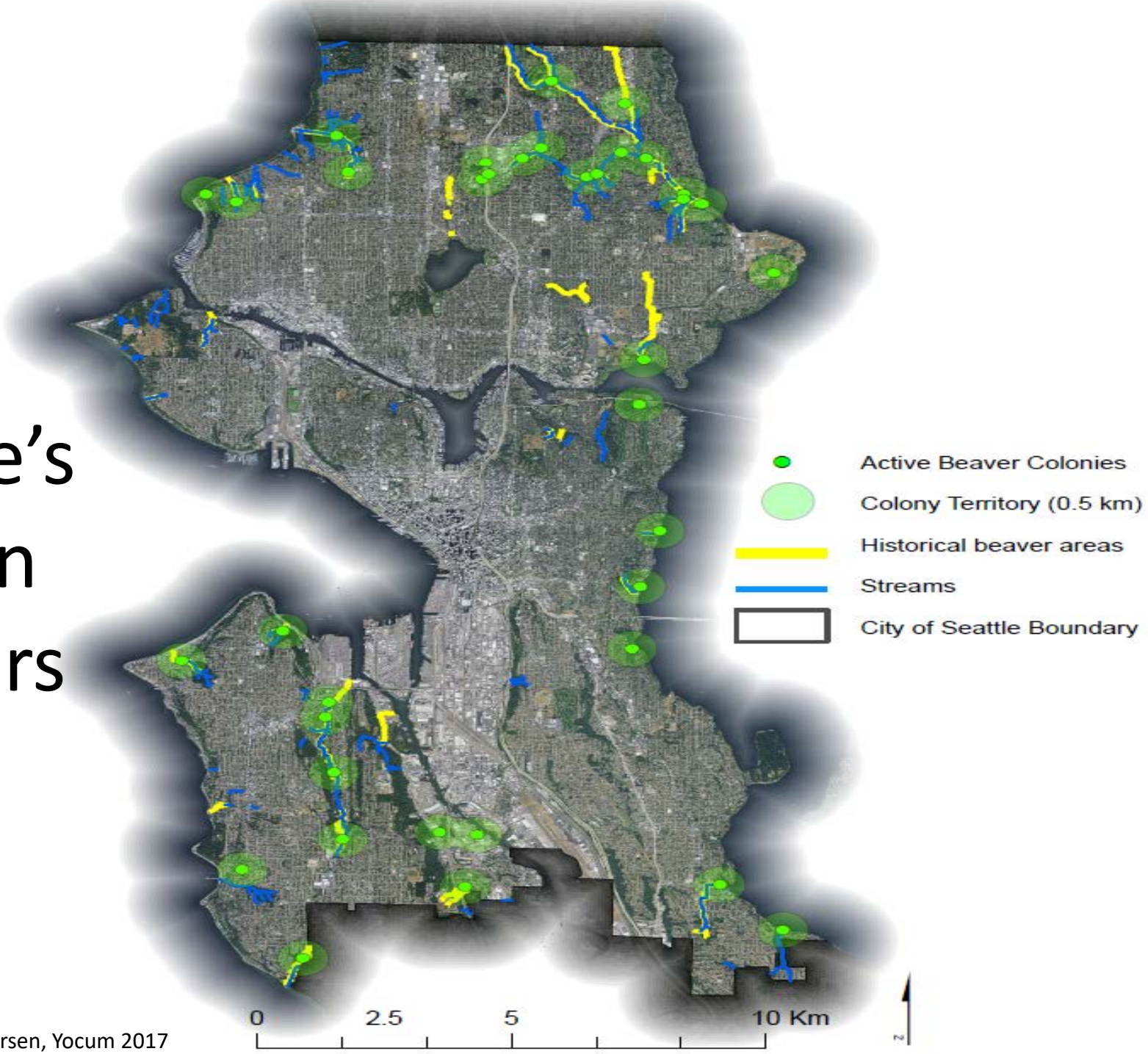
- Historic: 50-100 million
- Early 1900's: near extirpation
- Current: 6–12 million (~90% decline) but expanding

Why are Populations Expanding?

- Trapping Laws Changed 2001

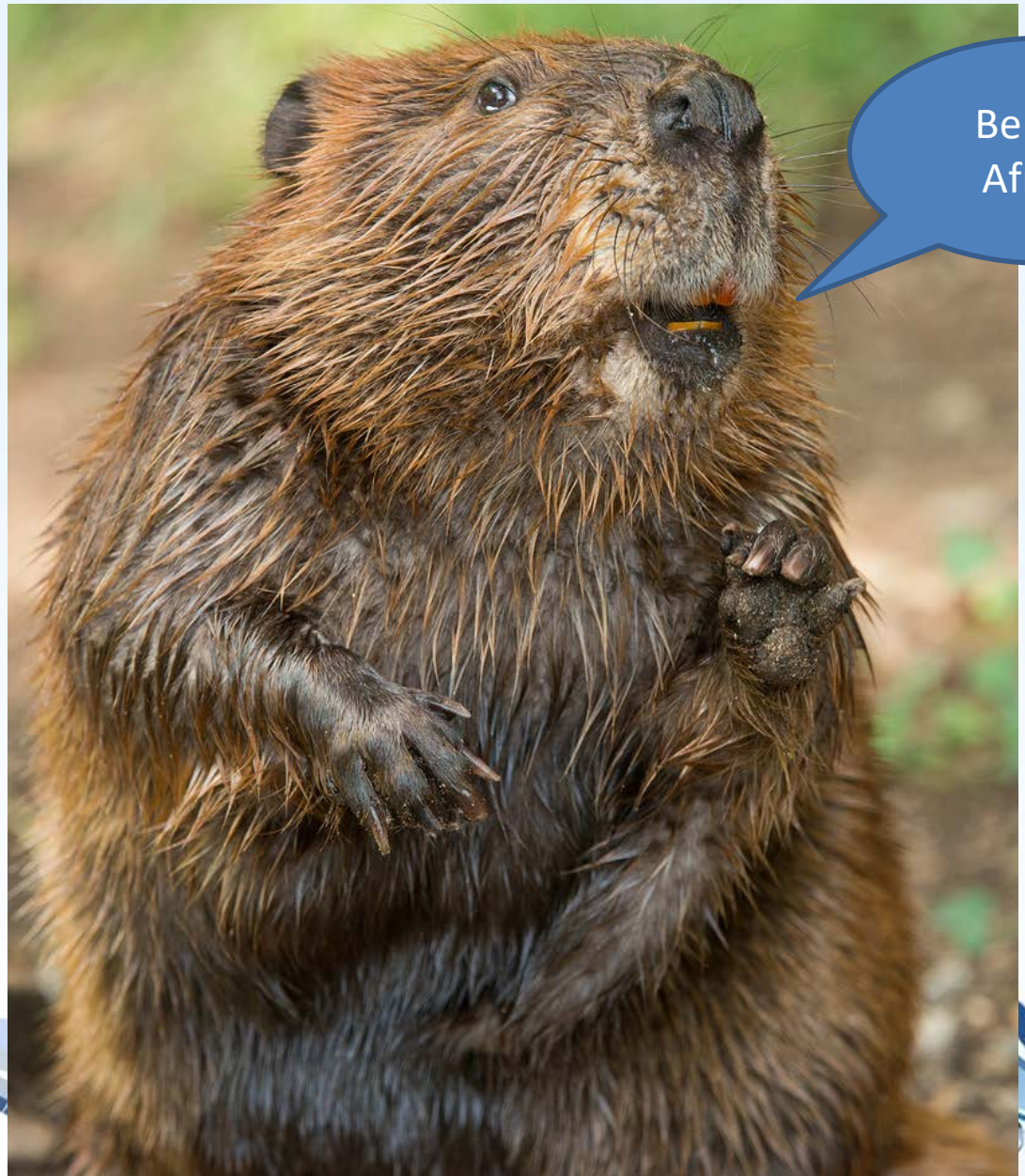


Seattle's Urban Beavers



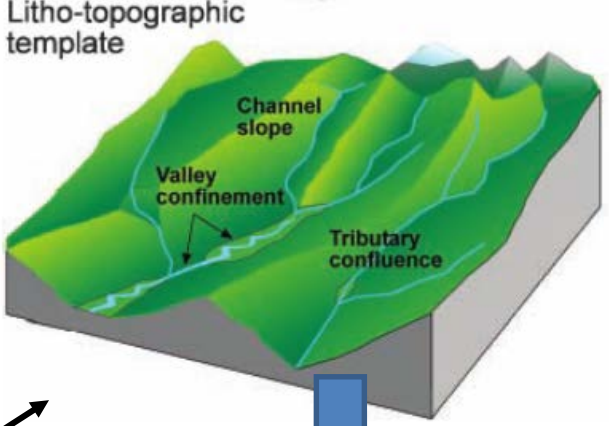
Bailey, Dittbrenner, Torgersen, Yocum 2017

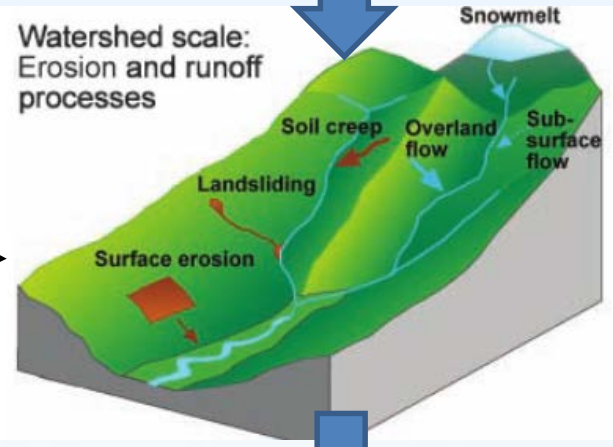
Implications for Restoration

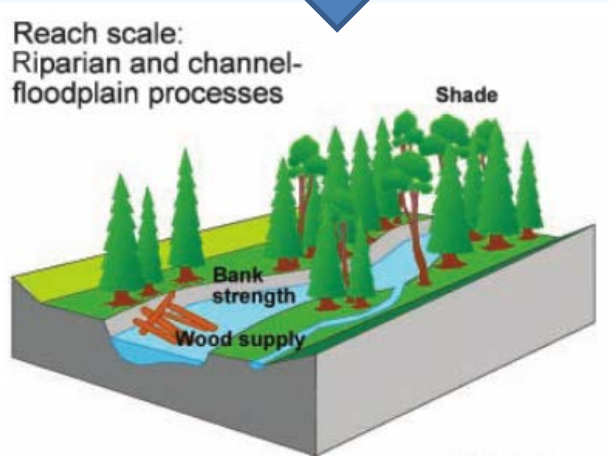


Process-based Restoration

- Ecosystem conditions governed by ecosystem processes
- Processes are scale dependent
  - Geologic processes → Channel form
  - Surface erosion & slides → sediment regime
  - Channel migration, wood recruitment→ channel morphology
- Common theme in failed restoration:
  - We treat symptom, not problem







Beavers drive many ecosystem processes

- Multiple scales
- Increase complexity
  - Geomorphology
  - Stream thermal variability
  - Species and community diversity
- Stabilize ecosystem processes
  - Increase resistance & resilience

Beavers drive processes

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Beavers **ARE** an ecosystem process

- If beaver = ecosystem process,

  Then beavers required in process based restoration

Common Fears

1. Dams have potential to create conflict
2. Dams causing fish blockages
3. Ponds are heat sinks, raise stream temps

Conflict resolution


Beaver dams are rarely
fish passage barriers

Beaver Pond & Stream Temps

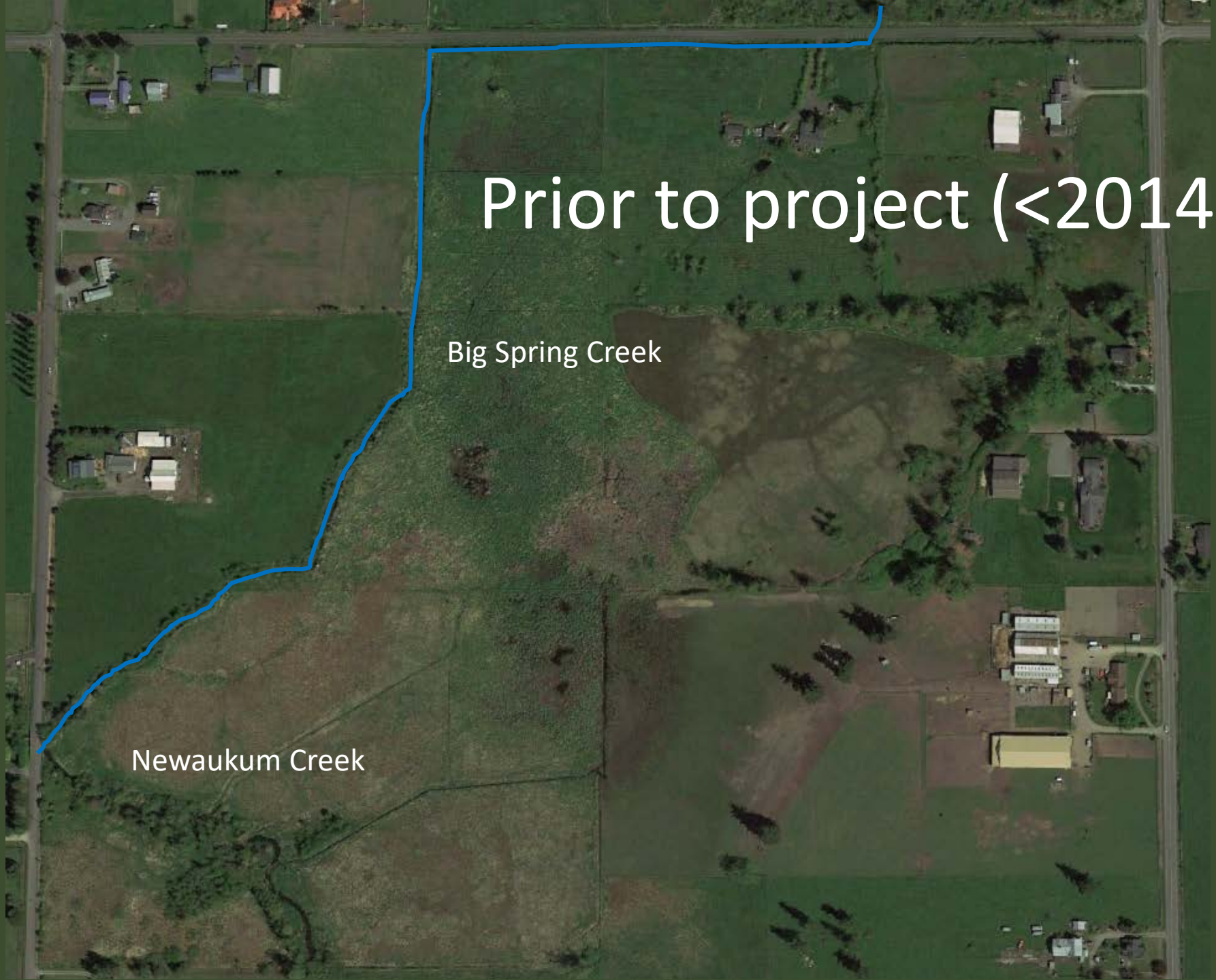
85
80
75
70
65
60
55
50
45

07/15/15
07/25/15
08/04/15
08/14/15
08/24/15
09/03/15
09/13/15

Big Spring Creek Restoration

A beaver-assisted restoration case study

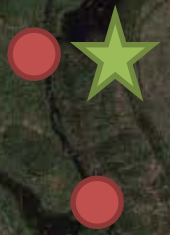
- Large project
- Constraints
- Area beavers
- Flexibility in meeting site goals


Prior to project (<2014)
Big Spring Creek
Newaukum Creek

Construction finished summer 2014

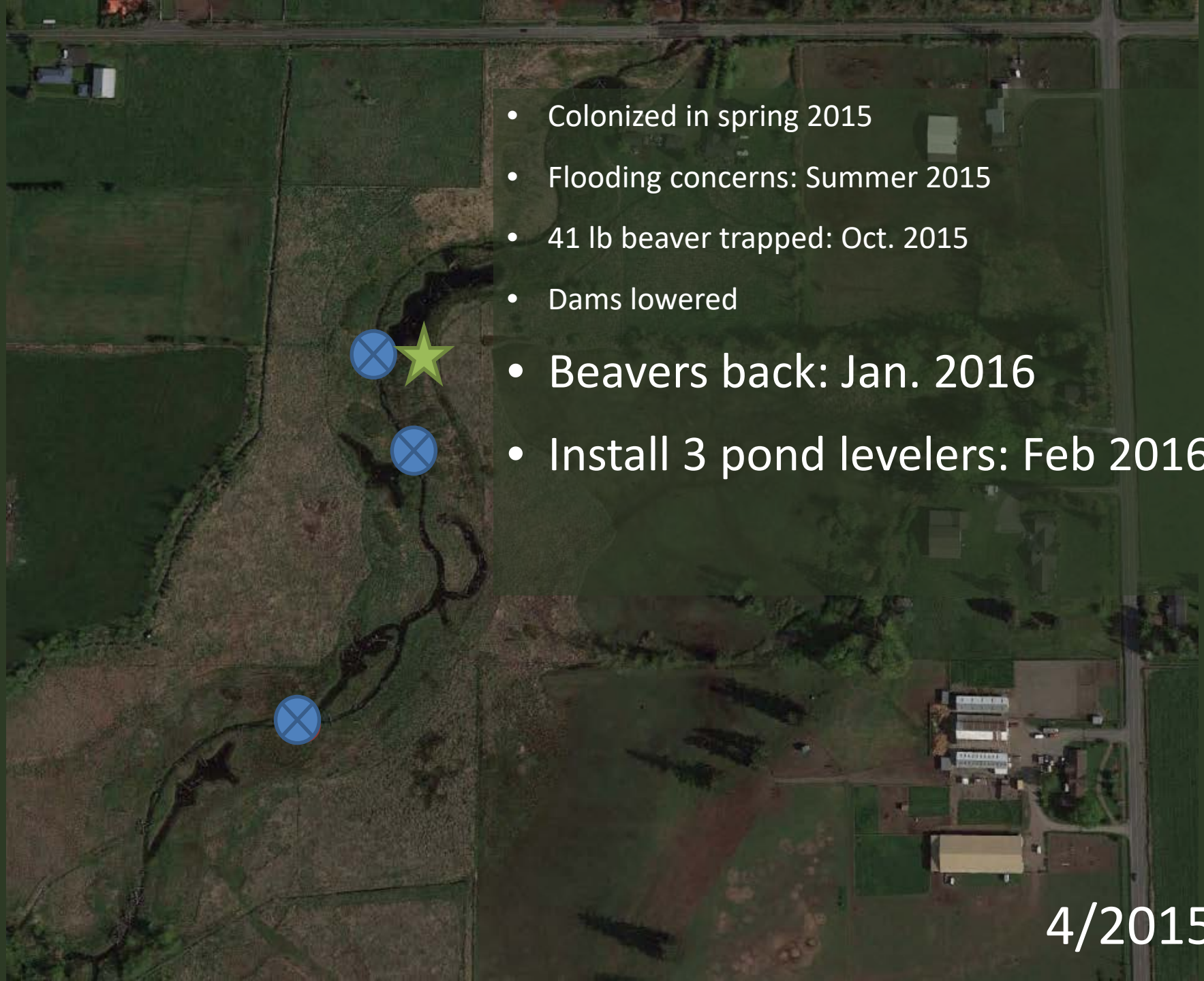
7/2014

Colonized in spring 2015



- Flooding concerns: Summer 2015
- 41 lb beaver trapped: Oct. 2015
- Dams lowered

7/2014



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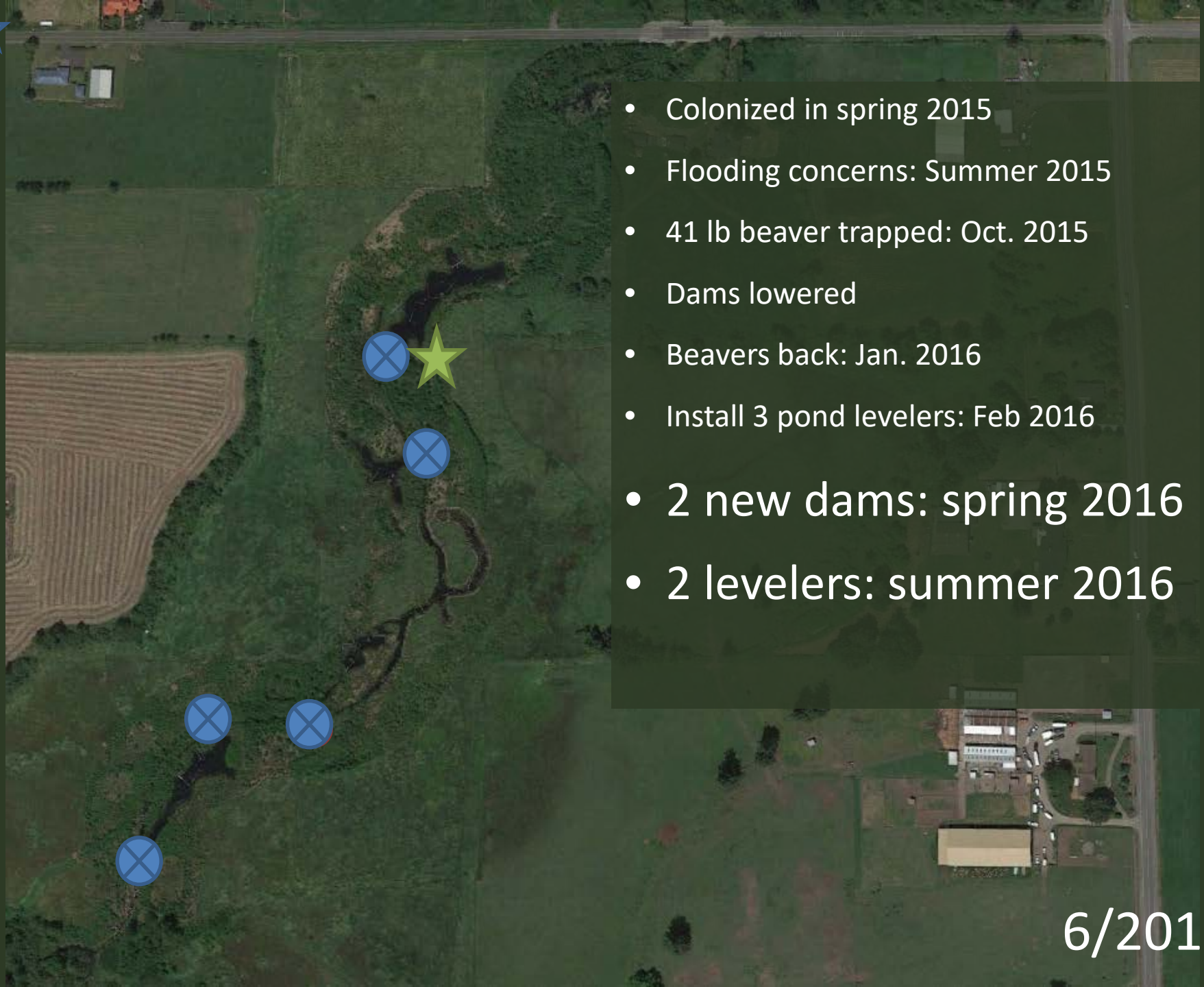
- Beavers back: Jan. 2016
- Install 3 pond levelers: Feb 2016

4/2015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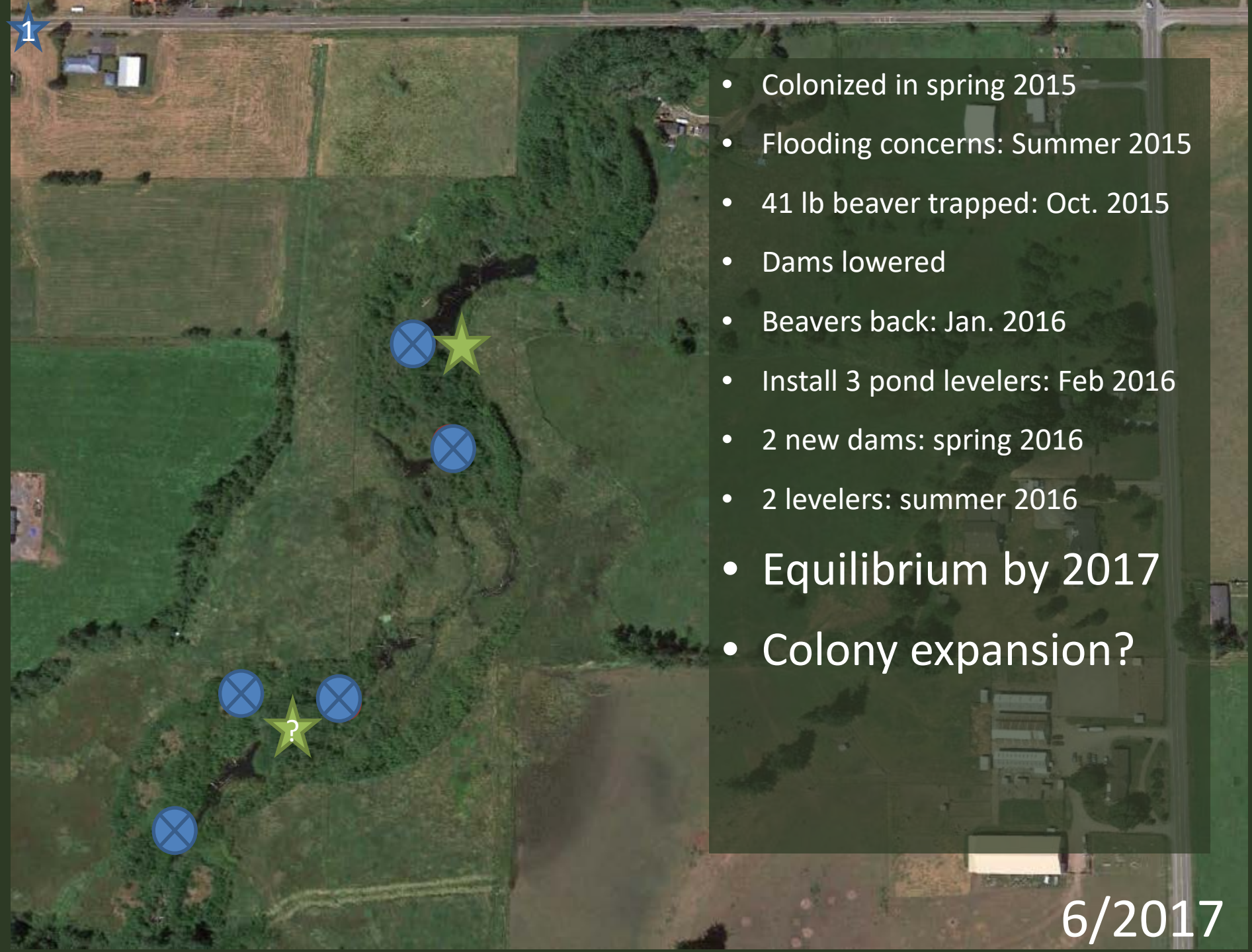
6/2016



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- 2 levelers: summer 2016
- Equilibrium by 2017
- Colony expansion?

6/2017

Unknowns & challenges

- Site at capacity?
  - Density?
- More dam building?
- Long narrow channels

Benefits

- Huge surface, GW holding
- Heavy browse, prolific regrowth
- High biodiversity

Conclusions

- Beavers ARE an (often missing) ecological process
- Include in design – they are coming!
- Constrained sites very tricky
- Long-term maintenance budget?
  - Manage expectations, timeline
  - Open ended success criteria

Thank You - Questions

Project Team & Collaborators

University of Washington
Benjamin Dittbrenner
Christian Torgersen
Josh Lawler
Susan Bolton
Aaron Wirsing
Julian Olden

Beavers Northwest
Abby Hook
Jake Jacobson
Elyssa Kerr
Shawn Behling

US Forest Service
Kent Woodruff
Joe Neal
Andy Bryden
Sonny Paz

King County
Josh Latterell
Laura Hartema
Jen Vanderhoof

CREOi
Michelle Wainstein

WDFW
Bob Everitt
Jamie Bails

NW Climate Science Center
Amy Snover
Meade Crosby

Tulalip Tribes
Jason Schilling
Mike Sevigny
Molly Alves
Terry Williams
Josh Kubo

NOAA NWFSC
Michael Pollock
Jason Hall

Snohomish County
Mike Rustay

Snohomish Cons. District
Cindy Dittbrenner
Alex Pittman

Research Crew (AKA Beaver Believers): Chris Tran, Susan Priest, Zoe Hayes, Desirae Belcher, David Hagopian, Olivia McGrath